WHAT IS CLAIMED IS:

1. An image processor equipped with deciding means for deciding formation amounts of a low-density dot and of a high-density dot for a unit area of a printing medium according to a density level of input image data used for printing an image on said printing medium, wherein

said deciding means decides the formation amounts of the low-density dot and of the high-density dot in accordance with said density level in such a way that, as said density level rises, the formation amount of said low-density dot is gradually increased up to a first peak amount and, after reaching the first peak amount, gradually decreased, and in a range of density levels higher than a predetermined density level at which the low-density dot is formed in the specified amount, as said density level rises, the formation amount of said high-density dot is gradually increased up to a second peak amount smaller than said first peak amount.

2. An image processor according to claim 1, wherein said predetermined density level at which the formation of said high-density dot is started is lower than a density level that corresponds to said first peak amount.

3. An image processor according to either of claim 1 or claim 2, wherein the formation amount of said low-density

dot at said predetermined density level at which the formation of said high-density dot is started is 2 or more times said second peak amount.

4. An image processor according to either of claim 1 or claim 2, wherein the formation amount of said low-density dot at said predetermined density level at which the formation of said high-density dot is started is 1.75 or more times said second peak amount.

5. An image processor according to either of claim 1 or claim 2, wherein said first peak amount which is the maximum formation amount of said low-density dot for said unit are is set to 1.75 or more times said second peak amount which is the maximum formation amount of said high-density dot for said unit area.

6. An image processor according to either of claim 1 or claim 2, wherein said first peak amount which is the maximum formation volume of said low-density dot for said unit are is set to 2 or more times said second peak amount which is the maximum formation volume of said high-density dot for said unit area.

7. An image processor according to either of claim 1 or claim 2, wherein said deciding means decides the number of said low-density dots and the number of said high-

density dots both of which area to be formed for said unit area in accordance with said density level.

8. An image processor according to claim 7, wherein the number of said low-density dots that are formed for said unit area at the density level that corresponds to said first peak amount is 1.75 or more times the number of said high-density dots that are formed for said unit area at the density level that corresponds to said second peak amount.

9. An image processor according to claim 1, wherein a density level whose granularity G by the granularity evaluation function becomes not more than 0.6 is set as said predetermined density level at which the formation of said high-density dot is started, and

said granularity evaluation function for evaluating the granularity G that is the standard deviation of the pixel values in the image P' that was obtained by putting the image P through a visual filter being expressed by the following expression;

$$G = \left\{ 1/\left(N^2 - 1\right) \sum_{i,j=1}^{N} \left(P'ij - \overline{P}\right)^2 \right\}^{1/2}$$

$$\overline{P} = 1/N^2 \sum_{i,j=1}^{N} P'ij$$

$$P'ij = IFFT\left\{ FFT\left(P'ij\right) \sum V\left(f\right) \right\}$$

$$V\left(f\right) = \begin{cases} 5.05e^{-0.138f}\left(1 - e^{-0.1f}\right) & : f \geqq 5 \\ 1 & : f < 5 \end{cases}$$

where i is a pixel position in X direction, j is a pixel position in Y direction, and N is a size of the image P in X direction and in Y direction.

10. An image processor according to claim 9, wherein a density level at which the granularity G by the said granularity evaluation function becomes not more than 0.4 is set as said predetermined density level at which the formation of said high-density dot is started.

11. An image processor according to claim 1, wherein said low-density dot is an ink dot formed by applying a light ink having a relatively low dye concentration on said printing medium and said high-density dot is an ink dot formed by applying a dark ink having a relatively high dye concentration on said printing medium.

12. An image processing method that decides formation amounts of a low-density dot and of a high-density dot for a unit area of a printing medium in accordance with a density level of the input image data used for printing an image on said printing medium, wherein

the formation amounts of the low-density dot and of the high-density dot are decided in such a way that, as said density level rises, the formation amount of said low-density dot is gradually increased up to the first peak amount and, after reaching the first peak amount, gradually decreased, and in a range of density levels higher than a predetermined density level at which the low-density dot is formed in specified amount, as said density level rises, the formation amount of said high-density dot is gradually increased up to a second peak amount smaller than said first peak amount.

13. An image processing method according to claim 12, wherein said predetermined density level at which the formation of said high-density dot is started is lower than the density level that corresponds to said first peak amount.

14. An image processing method according to either of claim 12 or claim 13, wherein the formation amount of said low-density dot at said predetermined density level at which the formation of said high-density dot is started

is 2 or more times said second peak amount.

15. An image processing method according to either of claim 12 or claim 13, wherein the formation amount of said low-density dot at said predetermined density level at which the formation of said high-density dot is started is 1.75 or more times said second peak amount.

16. An image processing method according to either of claim 12 or claim 13, wherein said first peak amount which is the maximum formation amount of said low-density dot for said unit area is set to 1.75 or more times said second peak amount which is the maximum formation amount of said high-density dot for said unit area.

17. An image processing method according to either of claim 12 or claim 13, wherein said first peak amount which is the maximum formation amount of said low-density dot for said unit are is set to 2 or more times said second peak amount which is the maximum formation amount of said high-density dot for said unit area.

18. An image processing method according to either of claim 12 or claim 13, wherein the number of said low-density dots for a unit area and the number of said high-density dots for a unit area both of which are to be formed are decided in accordance with said density level.

19. An image processing method according to claim 18, wherein the number of said low-density dots that are formed for said unit area at the density level that corresponds to said first peak amount is 1.75 or more times the number of said high-density dots that are formed for said unit area at the density level that corresponds to said second peak amount.

20. An image processing method according to claim 12, wherein

a density level at which the granularity G obtained by the granularity evaluation function becomes not more than 0.6 is set as said predetermined density level at which the formation of said high-density dot is started,

said granularity evaluation function for calculating the granularity G that is the standard deviation of pixel values in the image P' obtained by putting the image P through a visual filter being expressed in the following equations,

$$G = \left\{ 1/\left(N^2 - 1\right) \sum_{i,j=1}^{N} \left(P'ij - \overline{P}\right)^2 \right\}^{1/2}$$

$$\overline{P} = 1/N^2 \sum_{i,j=1}^{N} P'ij$$

$$P'ij = IFFT\left\{ FFT\left(P'ij\right) \sum V\left(f\right) \right\}$$

$$V\left(f\right) = \begin{cases} 5.05e^{-0.138f}\left(1 - e^{-0.1f}\right) : f \geqq 5 \\ 1 : f < 5 \end{cases}$$

where i is a pixel position in X direction, j is a pixel position in Y direction, and N is a size of the image P in X direction and in Y direction.

21. An image processing method according to claim 20, wherein a density level at which the granularity obtained by said granularity evaluation function becomes not more than 0.4 is set as said predetermined density level at which the formation of said high-density dot is started.

22. An image processing method according to claim 12, wherein said low-density dot is an ink dot formed by applying a light ink having a relatively low dye concentration on said printing medium and said high-density dot is an ink dot formed by applying a dark ink having a relatively high dye concentration on said printing medium.

23. A printing apparatus comprising:

an image processing portion for executing an image processing method according to claim 12; and

a printing portion for forming said low-density dot and said light density dot on a printing medium in accordance with formation amounts of the low-density dot and of the high-density dot that were decided by said image processing portion.

24. A printing apparatus according to claim 23, wherein said printing portion is an ink-jet printing head capable of ejecting the light ink for forming said low-density dot and a dark ink for forming said high-density dot.

25. A printing apparatus according to claim 24, wherein said ink-jet printing head has an electrothermal converter for generating thermal energy that is used to eject said light ink and said dark ink.

26. A printing method comprising:

an image processing step for executing one image processing method according to claim 12; and

a dot forming step for forming said low-density dot and light density dot on a printing medium in accordance with the formation amounts of the low-density dot and of the high-density dot that were decided in said image

processing step.

27. A printing method according to claim 26, wherein said dot forming step uses an ink-jet printing head capable of ejecting the light ink for forming said low-density dot and a dark ink for forming said high-density dot.

28. A printing method according to claim 27, wherein said ink-jet printing head has an electrothermal converter for generating thermal energy that is used to eject said light ink and said dark ink.

29. A control program for controlling a printing apparatus that uses a printing portion for forming a low density dot and a high-density dot on a printing medium and prints an image on said printing medium, wherein

when deciding formation amounts of a low-density dot and of a high-density dot for a unit area of said printing medium in accordance with the density level of the input image data used for printing the image on said printing medium,

the control program makes a computer execute a step of deciding the formation amounts of the low-density dot and of the high-density dot per unit area in accordance with said density level in such a way that, as said density level rises, the formation amount of said low-density dot is gradually increased up to a first peak amount and, after

reaching the first peak amount, gradually decreased, and in a range of density levels higher than a predetermined density level at which the low-density dot is formed in the specified amount, as said density level rises, the formation amount of said high-density dot is gradually increased up to a second peak amount smaller than said first peak amount.

30. A control program according to claim 29, wherein said predetermined density level at which the formation of said high-density dot is started is lower than the density level that corresponds to said first peak amount.

31. A control program according to either of claim 29 or claim 30, wherein the formation amount of said low-density dot at said predetermined density level at which the formation of said high-density dot is started is 2 or more times said second peak amount.

32. A control program according to either of claim 29 or claim 30, wherein the formation amount of said low-density dot at said predetermined density level at which the formation of said high-density dot is started is 1.75 or more times said second peak amount.

33. A storage medium that stored a computer-readable program code in which a control program according to claim

29 is stored.